

# High renewable penetration: a new “tragedy of the commons”<sup>1</sup>

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**David Newbery**

## Abstract

At high levels of wind penetration, surplus wind that cannot be exported must be curtailed. Marginal curtailment is 3-4+ times the average curtailment, but even in an efficiently designed market, price signals for wind investment are given by *average* not *marginal curtailment*, creating a « tragedy of the commons » that requires a corrective charge to restore efficiency. The paper sets out a model calibrated to Ireland in 2026, showing the source of distortion, and derives new formulae for the capacity credit of wind, the learning subsidy and corrective charge needed to deliver the efficient level of renewables penetration, and estimates of their magnitude.

**Keywords** wind curtailment, market failures, corrective charges

**JEL Classification** D41, D61, H23; H41, Q28

Contact dmgn@cam.ac.uk  
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<sup>1</sup> This paper is a shorter and simpler version of “Club goods and a tragedy of the commons: the *Clean Energy Package* and wind curtailment” (EPRG 2036) dated 31 December 2020.